IN THE CLAIM

1-5. (canceled)

6. (currently amended) A method of forming a thin film, comprising:

in an intermediate thin film forming step, sputtering a target comprising at least one type of metal to form an intermediate thin film comprising the metal or an incomplete reactant of the metal onto a substrate;

in a film composition converting step, bringing the formed intermediate thin film into an active seed of a reactive gas mixed with an inactive gas having a chemically inactive property in such a manner that the intermediate thin film is reacted with the active seed of the reactive gas, and converted into a compound of the metal; and

in an optical characteristic adjusting step,

repeatedly conveying a substrate holder between a zone to perform the intermediate thin film forming step and a zone to perform the film composition converting step while controlling a conveying speed of the substrate holder for holding the substrate,

repeatedly performing the intermediate thin film formation and the film composition conversion, and

accordingly adjusting a film composition of a finally formed thin film to form the thin film having an optical characteristic value of a region where a hysteresis phenomenon occurs in which a change route of the optical characteristic value differs with a reactive gas flow rate in a case where a flow rate of the reactive gas is increased and a case where the flow rate is decreased, wherein the region where the hysteresis phenomenon occurs is a range in which the reactive gas introduced during the sputtering has a flow rate of 15 sccm or less, which does not include 0 sccm.

7. (previously presented) The thin film forming method according to claim 6, wherein the optical characteristic adjusting step comprises:

at least one of rotating and driving the substrate holder holding the substrate on an outer peripheral face and having a cylindrical or hollow polygonal columnar shape; and

controlling a rotation speed of the substrate holder to form the thin film having the optical characteristic value in the region where the hysteresis phenomenon occurs.

8. (canceled)

9. (withdrawn) A thin film forming apparatus comprising:

a substrate holder which is disposed in a vacuum tank and which holds a substrate;

a film formation process zone which is disposed in the vacuum tank and in which sputtering is performed with respect to a target comprising at least one type of metal to form an intermediate thin film on the substrate;

a reaction process zone comprising an active seed generator for generating an active seed of a reactive gas, and disposed in the vacuum tank, in which the intermediate thin film is reacted with the active seed of the reactive gas to form a thin film;

a partitioning mechanism for spatially separating the film formation process zone and the reaction process zone from each other;

a substrate holder driver for driving the substrate holder in order to convey the substrate between a position facing the film formation process zone and a position facing the reaction process zone; and

substrate holder conveying speed controller for controlling the substrate holder driver in a range configured to form the thin film having an optical characteristic value in a region where a hysteresis phenomenon occurs in which a

change route of the optical characteristic value differs with respect to a reactive gas flow rate in a case where the flow rate of the reactive gas is increased and in a case where the rate is decreased.

10. (currently amended and withdrawn) The thin film forming apparatus according to claim 9 ~~4~~, wherein the region where the hysteresis phenomenon occurs is a region of the optical characteristic value of the thin film formed when the reactive gas introduced in performing the sputtering has a flow rate of 15 sccm or less, which does not include 0 sccm.

11. (new) A method of forming a thin film comprising:

sputtering a target in a sputtering zone, wherein the target comprises at least one type of metal, wherein the sputtering forms an intermediate thin film on a substrate, and wherein the intermediate thin film comprises the metal or an incomplete reactant of the metal;

reacting the intermediate thin film with a mixture of a reactive gas and an inactive gas in a reactive zone so as to convert the intermediate thin film into a compound of

the metal, wherein the inactive gas has a chemically inactive property; and,

repeatedly conveying the substrate between the sputtering zone and the reactive zone at a conveying speed that adjusts an optical characteristic of the thin film in a hysteresis region where the optical characteristic is different depending upon whether a flow rate of the reactive gas is increased or is decreased.

12. (new) The method of claim 11, wherein the repeated conveying of the substrate comprises conveying the substrate along a periphery having at least one of a cylindrical and a hollow polygonal columnar shape.

13. (new) The method of claim 11, wherein the hysteresis region comprises a region where the reactive gas has a flow rate of 15 sccm or less and does not include 0 sccm.

14. (new) The method of claim 11, wherein the sputtering of a target in a sputtering zone comprises reversing polarity between first and second sputtering electrodes so that the first electrode oscillates between being cathode and anode states, so that the second electrode

has an anode state while the first electrode has a cathode state, and so that the second electrode has a cathode state while the first electrode has an anode state.